July 2, 1935. R. W. GRIFFITH 2,006,916

TUMBLER TRIMMING TOOL

Filed Jan. 12, 1933 2 Sheets-Sheet 1

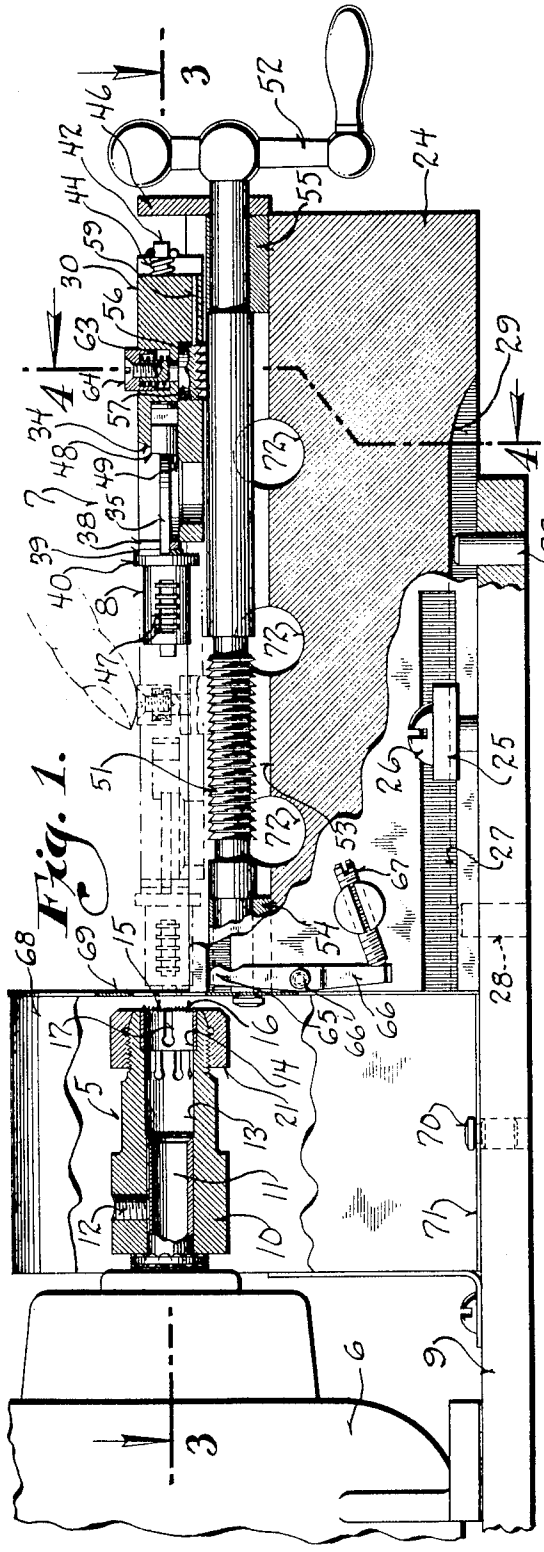


Fig. 1.

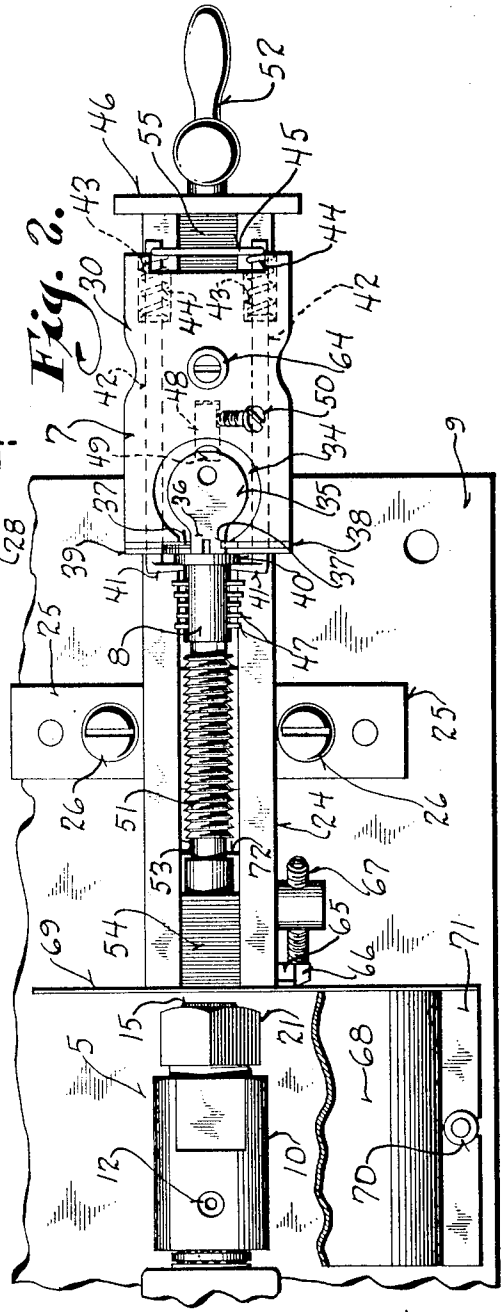


Fig. 2.

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Filed Jan. 12, 1933 2 Sheets-Sheet 2

Fig. 3.

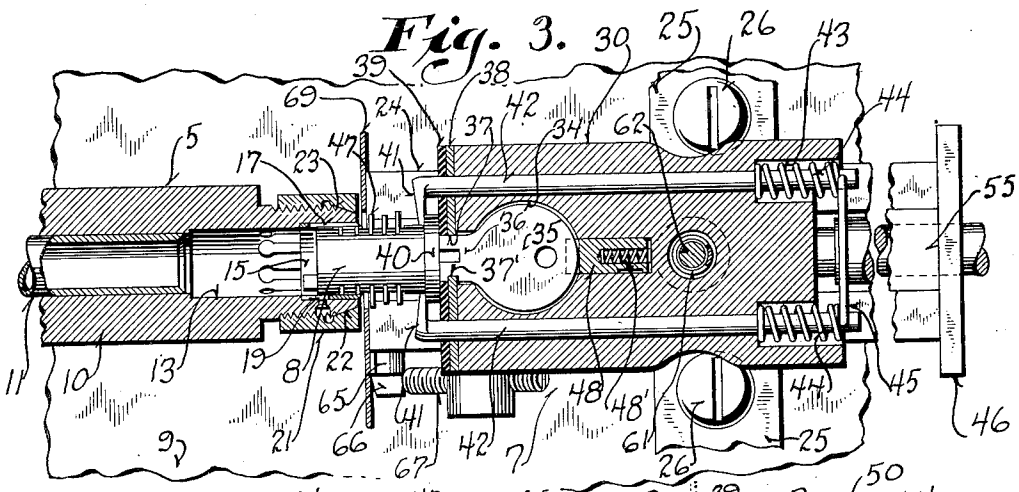


Fig. 4.

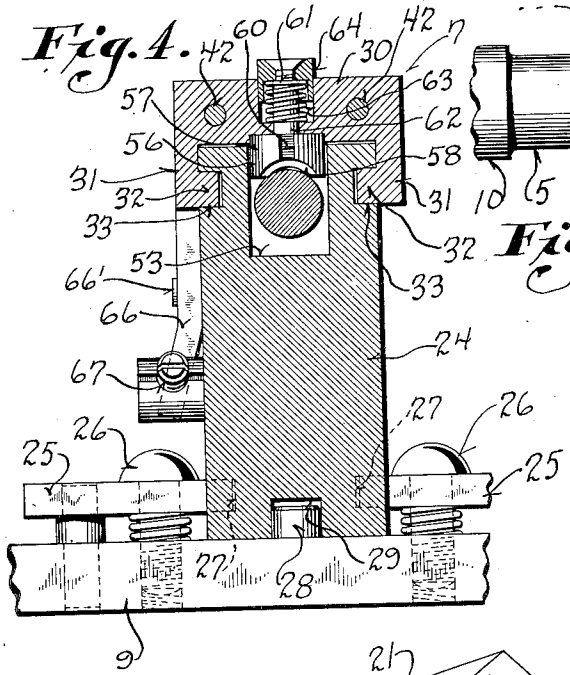
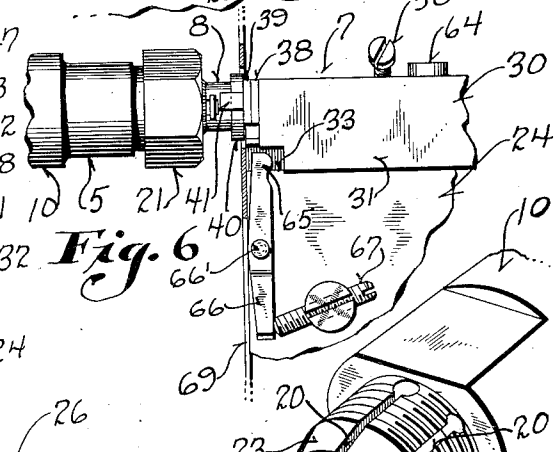


Fig. 6



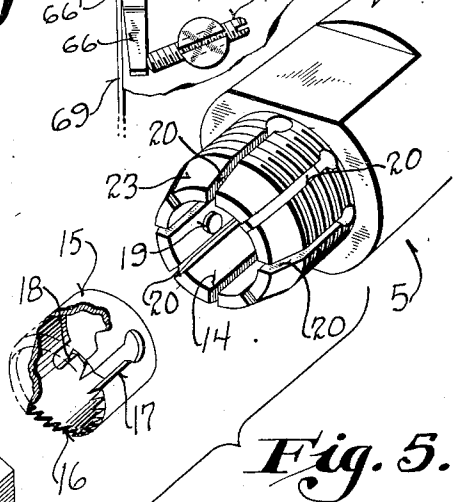


Fig. 7.

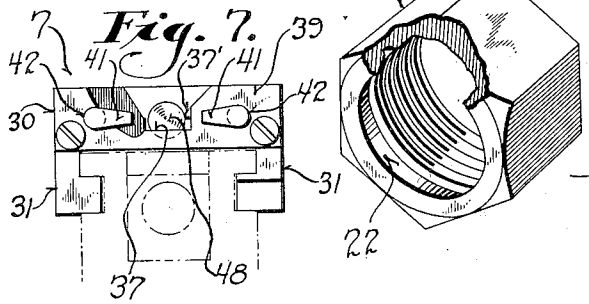


Fig. 5.

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UNITED STATES PATENT OFFICE

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TUMBLER TRIMMING TOOL

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14 Claims. (Cl. 90—14)

This invention relates to certain new and useful improvements in tools for trimming off the projecting ends of the tumblers of lock cylinders and has, as a general object, to provide a device of the character described, by which all of the tumblers of a lock cylinder may be quickly and accurately cut off to the proper length.

Another object of this invention is to provide means for rigidly holding a lock cylinder with its key in proper position and for moving a lock cylinder in a fixed line for proper engagement with a rotatable hollow cutter.

Another object of this invention is to provide a tool of the character described which is so constructed as to preclude injury to the operator.

Another object of this invention resides in the novel construction of the specific cutter employed and in the provision of simple means for adjusting, within limits, the effective diameter of the cutter.

A further object of this invention resides in the provision of releasable means for holding the lock cylinder on its carriage, which means is readily released by retraction of the carriage.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a side elevation of a tool embodying this invention with parts broken away and in section to illustrate structural details;

Figure 2 is a top plan view;

Figure 3 is an enlarged section view taken through Fig. 1, on the plane of the line 3—3; and illustrating the manner in which the lock cylinder is carried into the cutter;

Figure 4 is a detail section view taken through Fig. 1, on the plane of the line 4—4;

Figure 5 is a detail perspective view of the cutter and its chuck shown separated; and

Figure 6 is a detail view illustrating the adjustable stop for limiting the forward travel of the cylinder carrying carriage.

Referring now more particularly to the accompanying drawings in which like numerals indicate like parts throughout the several views, the numeral 5 represents generally a rotatable cutter head driven from an electric motor or other source of power 6. The cutter head 5 is disposed with its longitudinal axis substantially horizontal, and a carriage indicated generally by the numeral 7, is slidably mounted for movement parallel to the axis of the cutter head to carry a lock cylinder 8 to and from engagement with the cutter head. The entire mechanism is mounted on a common base 9.

The cutter head 5 comprises a hollow chuck 10 removably fixed to the projected end 11 of the motor shaft by means of a set screw 12. The chuck 10 has a bore 13 of a diameter slightly greater than the diameter of the lock cylinder to permit free insertion of the cylinder therein, but sufficiently close to afford a guide for the cylinder during the cutting operation. The outer end of the chuck is counterbored as at 14 and mounted in the counterbore 14 is a circular band-like cutter 15.

The cutter 15 is formed of a band of thin springy metal of a thickness equal to the width of the counterbore shoulder and has its outer end serrated and sharpened to form a cutting edge 16. Extended inwardly from the cutting edge 16, but terminating short of the opposite end of the cutter, is a slot 17 which permits contraction of the outer end portion of the cutter to effect a limited adjustment of its effective diameter. The inner end of the cutter has a notch 18, which is engageable with a pin 19 extending inwardly from the wall of the counterbore to provide a non-rotatable connection between the cutter and the chuck.

With the cutter in place, its inner diameter forms substantially a continuation of the bore 13 in the chuck, which diameter is slightly greater than the diameter of the lock cylinder. The outer cutting edge portion of the cutter being contractable, is adjustable and is set to just clear the diameter of the cylinder. To effect this adjustment of the outer end of the cutter, the counterbored end portion of the chuck is split up into a plurality of segments by a series of slots 20. Threaded on this outer end portion of the chuck is an adjusting nut 21, the outermost end portion of which has a tapered bore 22 to engage with the extreme end portion of the chuck which is correspondingly tapered as at 23. Screwing down the nut 21 contracts the chuck segments and the cutting edge portion of the cutter.

It is observed that the motor shaft 11 is hollow to accommodate extensions formed on the inner end of the lock cylinders.

Adjustably mounted on the base 9 is a carriage support 24. The means for securing this support to the base comprise a pair of clamping plates 25 drawn down towards the base by screws 26 and having their inner ends engaging in grooves 27. A pair of dowel pins 28 project upwardly from the base to engage in a central groove 29, to guide the support 24 for movement to and from the cutter head.

Slidable on the top of the support 24 is the carriage per se which comprises a block 30 having downwardly projecting flanges 31 to overlie the sides of the support. The lower edges of the flanges 31 have inwardly directed portions 32, which are received in guideways 33, cut into the opposite sides of the support 24 so that the carriage block is slidably held down on the support.

Formed in the top of the carriage block 30 adjacent its forward end facing the cutter head is a cavity or pocket 34. This cavity or pocket is adapted to receive the key 35 of a lock cylinder, the tumblers of which are to be trimmed. As illustrated, the key is positioned flatwise within the cavity or pocket 34 with its shank 36 projecting therefrom through an aperture 37 leading from the cavity to the forward end of the carriage block. The bottom of the aperture 37 engages the shank of the key to support it and the cylinder as best illustrated in Fig. 1, and an overhanging hook 37' projects over the top of the shank 36 to hold the key and cylinder against turning during the cutting operation.

If desired, the bottom of the aperture upon which the shank of the key rests may be provided by a plate 38 attached to the front wall of the carriage block. The hook 37 is also preferably formed on this plate. A fiber strip 39 covers the plate 38 to provide a facing against which the head of the cylinder may be engaged without danger of marring its finish.

As is customary in lock cylinders, the head thereof is formed with an enlarged flange 40. This flange provides means over which the ends of a pair of spring pressed cylinder retaining fingers 41 are engageable to grip the cylinder and hold the same in position. The spring pressed fingers 41 have elongated rod extensions 42 slidable in suitable bores formed in the carriage block. The ends of these extensions project from the rear of the block as shown.

At the rear end of the carriage block, the bores in which the extensions 42 are slidable, are counterbored as at 43, to receive expansive springs 44 disposed over the adjacent end portions of the extensions 42 and confined between the bottoms of the counterbores and a stop 45. The stop 45 comprises a wire having its ends turned downward at right angles to enter holes drilled in the ends of the pins 42. The wire 45 thus holds the extensions 42 against turning to insure the spring fingers 41 being maintained in their proper positions.

The springs 44 at all times tend to draw the fingers 41 toward the front wall of the carriage block and thus securely grip the flanged head of the cylinder. To facilitate the release of a cylinder so held, and to enable another to be mounted on the carriage, the projecting ends of the pins 42 are engageable with a wall 46 fixed to the support 24, upon complete retraction of the carriage block. Hence, when the operator wishes to position a cylinder on the carriage or to remove a cylinder from the carriage, he merely moves the carriage block to its extreme retracted position which automatically moves the spring fingers to their released positions enabling the application or removal of a lock cylinder.

Inasmuch as the proper position of the key in the lock cylinder is of utmost importance during the trimming of the tumblers 47, a stop 48 is mounted in the rear of the cavity 34 to engage the end of the key and hold it in its fully inserted position. This stop 48 is stepped to provide a projecting ledge 49 which engages the underside of the key and holds the assembled key and cylinder against tilting about the bottom of the aperture 37. The stop 48 is yieldably urged toward the key by a spring 48' and is held in a definite position by a set screw 50 threaded in the carriage block with its inner end bearing against a flattened face of the stop pin. The inner end of the screw, by engaging one end of the cut which forms the flat face in the stop pin, also serves to maintain the pin against displacement from its bore.

From the description thus far, it is apparent that when a lock cylinder, having a key positioned therein, is mounted on the carriage, it is positively held without manual assistance and with the barrel portion thereof entirely projected beyond the front of the carriage block to permit complete insertion thereof into the cutter head. Obviously, the carriage is so positioned that it holds the cylinder in axial alignment with the cutter.

Forward movement of the carriage block to project the cylinder into the cutter head may be effected manually, or the carriage may be propelled by means of a screw 51 turned by a crank 52 and operable on a nut member 56 on the carriage. The screw 51 is disposed in a longitudinal central groove 53 formed in the top of the carriage support 24 and is journalled at its opposite ends in suitable bearings 54 and 55 carried by the support 24.

As a substantial portion of the forward movement of the carriage and cylinder carried thereby is accomplished before any engagement of the cylinder with the cutter head takes place, the screw 51 may be shorter than the total distance between the bearings 54 and 55, and the nut member 56 is yieldably held in a position clearing the screw or any portion of its shaft, to be engageable with the screw only when desired.

Specifically, the nut member 56 comprises a cylindrical plug 57 having its lower end provided with threads 58 for engagement with the screw 51. A pin 59 fixed in the carriage block and engaged in a groove 60 formed in the plug serves to hold the plug against rotation. The lower end portion of the plug projects downwardly into the groove 53, but is yieldably held at a normal position raised above the screw 51 and its shaft by a spring 61 coiled about a reduced extension 62 projecting upwardly from the plug and entering a counterbore 63 in the top of the carriage block. The spring 61 is confined between the bottom of this counterbore 63 and a head 64 which projects above the top face of the carriage block to afford a push button which, upon depression, engages the screw threaded lower end of the plug with the screw 51.

The forward travel of the carriage block is limited by a stop 65 as best illustrated in Fig. 6. This stop comprises a lever 66 pivotally mounted as at 66' from the support 24 with its upper end forming the stop proper and held in the path

of the carriage block by a stop screw 67. The screw 67 affords a convenient adjustment for the position of the stop 65 and when retracted sufficiently, permits the upper end of the lever to be swung to a position at which removal of the carriage from its support is permitted. Such removal of the carriage, however, necessitates moving the support 24 away from the cutting head.

To preclude injury to the operator, the entire cutting head is enclosed by a guard housing 68, the front wall 69 of which has an opening of a size to enable the insertion of the lock cylinder without exposing the cutter. The guard housing may be detachably mounted by headed pins 70 fixed to the base and engageable in slots formed in flanges 71 at the bottom edges of the housing side walls, detachment of the housing requiring only inward flexure of the side walls.

To provide for the accumulation of chips, the support 24 has a plurality of transverse openings 72 which communicate with the groove 53 and lead to the opposite sides thereof.

Operation

In operation, the operator first inserts the key into the lock cylinder to position all of the tumblers properly. With the key in place, the lock cylinder is then positioned on the carriage block. This operation is performed by retracting the carriage block to its rearmost position at which the spring pressed fingers are released and then sliding the key head into the cavity 34 so that one edge of its shank engages under the overhanging hook 37' and its outer end rests on the projection 49 of the stop 46. To facilitate this engagement, the side walls of the cavity slope outwardly.

With the lock cylinder thus properly positioned, the carriage block is released from its rearmost position whereupon the spring fingers grip the flange of the cylinder and firmly hold it in place. The carriage block is then moved forward to a position at which the outermost end of the cylinder just begins to enter the cutter head. In this position, the button 61 is depressed to engage the nut member 56 with the screw thread 51. With the button depressed as shown in dotted lines in Fig. 1, the screw is turned by means of the crank 52 to run the carriage block forwardly.

The limit of the forward movement is defined by the engagement of the carriage block with the stop 65. At the end of this forward movement, the projecting ends of all of the tumblers have been trimmed off. The carriage block is then retracted to its rearmost position and the cylinder removed therefrom.

From the foregoing description taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art to which this invention appertains, that this invention affords a novel and highly practical tool for trimming off the projecting ends of tumblers in lock cylinders.

What I claim as my invention is:

1. A tool for cutting off the projecting ends of tumblers of lock cylinders comprising, a rotatable hollow cutter, means to drive said hollow cutter, a carriage movable in a direction parallel to the axis of the hollow cutter, means on said carriage to clamp the outer end portion of a lock cylinder against the end of the carriage facing the cutter with its inner end portion free and extended beyond the carriage in axial alignment with the hollow cutter to be carried into the hollow cutter by movement of the carriage, and means on the carriage to receive and hold a key inserted in the cylinder in proper position within the cylinder.

2. A tool for cutting off the projecting ends of tumblers of lock cylinders comprising, a rotatable hollow cutter, means to drive said hollow cutter, a carriage movable axially toward and away from the hollow cutter, and readily releasable means on the carriage to locate a lock cylinder in axial alignment with the hollow cutter by clamping the cylinder upon its end surface facing the cutter, and means on the carriage to receive and hold a key inserted in the cylinder in proper position within the cylinder.

3. A tool for cutting off the projecting ends of tumblers of lock cylinders comprising, a rotatable hollow cutter, means to drive said hollow cutter, a carriage movable axially toward and away from the cutter, releasable means engageable with the lock cylinder to hold the same on the carriage with its key properly positioned therein and with the cylinder in axial alignment with the hollow cutter for insertion therein upon forward movement of the carriage, and means on the carriage to hold the key in the lock cylinder.

4. A tool for cutting off the projecting ends of tumblers of lock cylinders comprising, a rotatable hollow cutter, means to drive said hollow cutter, a carriage movable axially toward and away from the hollow cutter and having a pocket in its forward end portion for the reception of a key which is inserted into a lock cylinder, a pair of yieldable fingers to grip a portion of the lock cylinder and hold it on the carriage with the key in proper position and in axial alignment with the hollow cutter whereby the lock cylinder enters the cutter upon forward motion of the carriage, and means to propel the carriage forward.

5. A tool for cutting off the projecting ends of tumblers of lock cylinders comprising, a rotatable hollow cutter, means to drive said hollow cutter, a carriage movable axially toward and away from the hollow cutter and having a pocket in its forward end portion for the reception of a key which is inserted into a lock cylinder, a pair of yieldable fingers to grip a portion of the lock cylinder and hold it on the carriage with the key in proper position and in axial alignment with the hollow cutter whereby the lock cylinder enters the cutter upon forward motion of the carriage, and means to propel the carriage forward, and means engageable with the spring fingers upon retraction of the carriage to free the lock cylinder for removal from the carriage.

6. A tool for cutting off the projecting ends of tumblers of lock cylinders comprising, a rotatable hollow cutter, means to drive said hollow cutter, a carriage movable axially toward and away from the hollow cutter and having a pocket in its forward end portion for the reception of a key which is inserted into a lock cylinder, a pair of yieldable fingers to grip a portion of the lock cylinder and hold it on the carriage with the key in proper position and in axial alignment with the hollow cutter whereby the lock cylinder enters the cutter upon forward motion of the carriage, and means to propel the carriage forward, said means to propel the carriage including a rotatable screw, and a nut member carried by the carriage and selectively engageable with the screw.

7. A device to trim off the ends of tumblers of lock cylinders comprising, a base, a rotatable

power head mounted on the base, a hollow cutter driven by said power head, a carriage support adjustably mounted on said base for axial movement toward and away from the hollow cutter, a carriage slidable on said support toward and away from the hollow cutter, means on said carriage to readily releasably grip a lock cylinder having a key inserted therein to hold the same in axial alignment with the hollow cutter for movement into the hollow cutter upon forward motion of the carriage, and means to propel the carriage forward comprising a screw rotatably but non-longitudinally movably mounted on said carriage support, and a nut member carried by the carriage and selectively engageable with the screw.

8. A machine for cylindrical cutting including, a hollow cutter having teeth on its end and a bore behind the teeth adapted for guiding engagement with the outside cylindrical surface of an object to be acted upon, a carriage to slide the object against the cutter and into the bore, and means to hold the object on the carriage including yieldable clamping means adapted to hold the outer end of the object against an abutment on the carriage, and means to prevent rotation of the object.

9. A machine for cutting off the projecting ends of blank tumblers in a lock cylinder conformably to a key including a rotary cutter, a carriage to guide the cylinder to the cutter, means to locate and clamp the cylinder to the carriage, means to apply pressure to the carriage to feed the cylinder against the cutter, and means accessibly located on the carriage to readily detachably couple the carriage with said pressure applying means.

10. A machine for cutting off the projecting ends of blank tumblers in a lock cylinder conformably to a key including a rotary cutter, a carriage to guide the cylinder to the cutter, means to locate and clamp the cylinder to the carriage, means to apply pressure to the carriage to feed the cylinder against the cutter, means accessibly located on the carriage to readily detachably couple the carriage with said pressure applying means, and means to disable the clamping means upon the return stroke of the carriage.

11. A machine for cutting off the projecting ends of blank tumblers in lock cylinders conformably to a key, including a rotary cutter, a carriage to guide the cylinder to the cutter, means on the carriage to prevent rotation of the cylinder including a surface to contact one side of the key and a ledge projecting over the other side of the key, and means to hold the cylinder on the carriage in a position projecting from one end of the carriage for presentation to the cutter.

12. A machine for cutting off the projecting ends of blank tumblers in a lock cylinder to conform to a key including, a rotary cutter, a carriage to guide the cylinder to the cutter, resilient means to clamp one end of the cylinder to the carriage with its other end arranged for presentation to the cutter, and means on the carriage to prevent rotation of the cylinder including a surface to contact one side of the key in the cylinder and a ledge projecting over the other side of the key.

13. A machine for cutting off the projecting ends of blank tumblers in a lock cylinder conformably to a key, comprising a rotary cutter, a carriage to guide the lock cylinder to the cutter, means on the carriage to locate and clamp the cylinder to the carriage, a guideway on which the carriage is slidably mounted and along which the carriage is adapted to be pushed by hand, a feed screw for propelling the carriage along the guideway, and readily accessible means on the carriage for detachably coupling the carriage to the feed screw.

14. A tool for cutting off the projecting ends of tumblers of lock cylinders comprising, a rotatable hollow cutter, means to drive said hollow cutter, a carriage movable toward and away from the cutter, and readily releasable means on the carriage to locate a lock cylinder in axial alignment with the hollow cutter by clamping one end of the cylinder to the end surface of the carriage facing the cutter with its other end portion free and extended for insertion into the hollow cutter.

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